The Journal of the American Association of Zoo Keepers, Inc.

AKF

Animal Keepers' Forum

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The American Association of Zoo Keepers, Inc. exists to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

ABOUT THE COVER

There are only a handful of AZA-accredited zoos that house moose (*Alces alces*) in North America, and Cheyenne Mountain Zoo is lucky enough to have an exhibit built directly into the mountain, creating a habitat as natural as you could hope for. As the largest species of the cervid family, moose are easily recognizable by their unique antlers and large size. Tahoma, pictured on the cover, demonstrated a unique antler growth, with the antlers never fully palmating out like expected, and instead appearing more "elk-ish" in appearance. True to the meaning of his name, Tahmoa's favorite place to hang out would be the edge of the water and munching on water hyacinth.

Male moose have antlers that are shed annually, and females can typically give birth to twins, or even triplets seasonally. They are browsers that enjoy marshlands, and are surprisingly great swimmers, enjoying the lush green plants found on the bottoms of riverbeds and lakes. They can actually stay underwater for up to 30 seconds, and can swim for miles without stopping. The moose at Cheyenne Mountain Zoo have enjoyed training for a variety of reinforcers, with a popular item being our "giraffe crackers" (which are just a rye cracker). The team has joked that at the elevation of the giraffe barn, they are giraffe crackers, but up in the Wild, they are moose crackers!

Articles sent to *Animal Keepers' Forum* will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for *AKF*. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the Editor. The Editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone, fax or e-mail contributions of late-breaking news or last-minute insertions are accepted as space allows. Phone (330) 483-1104; FAX (330) 483-1444; e-mail is shane.good@aazk.org. If you have questions about submission guidelines, please contact the Editor. Submission guidelines are also found at: aazk.org/akf-submission-guidelines/.

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This year's theme ***Healthy Keeper, Healthy Animals*** *encourages animal professionals to take care of themselves in order to better care for their animals.*

National Zoo Keeper Week (NZKW) is once again upon us! Each year, NZKW serves as an opportunity to promote the animal care profession and educate the public about the importance of the work that animal keepers do. This year's theme **Healthy Keeper, Healthy Animals** encourages animal professionals to take care of themselves in order to better care for their animals. Animal care can be exhausting physically, mentally, and emotionally for a myriad of reasons and it's important for caretakers to be proactive in their self-care to avoid burnout.

The physicality of our jobs is evident in the day-to-day work of being on our feet all day in all different weather conditions and often performing taxing work during these times. So we need to take care of our bodies in order for them to run efficiently. This work is a mixture of efforts done off-the-clock such as getting enough sleep and getting regular check-ups, and action in the workplace such as stretching and using proper lifting techniques. This sounds very simple, but during a busy workday (and sometimes even busier non-workday) it is important to keep your body running well. If you can't move, you can't care.

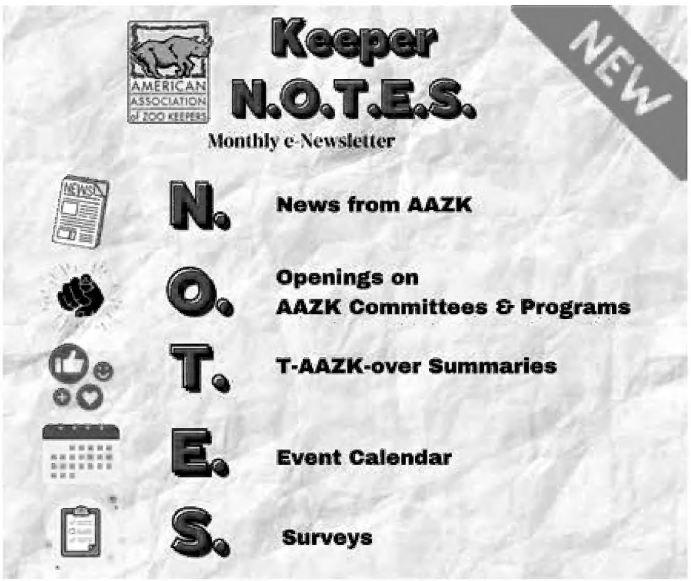
Work in this field is stressful as your day involves constantly thinking about your interactions with animals, the public, and coworkers and can also be stressful away from the job due to low income and irregular work schedules. Caring for mental health looks different for everyone, but actions such as taking regular breaks, engaging in hobbies, and practicing self-compassion are ideas for all keepers to consider. If you can't think, you can't care.

Care fields are noted for compassion fatigue due to the high level of emotion involved in caring for other living beings. Maintaining emotional health involves getting in touch with your emotions. Methods of emotional self-care can be establishing a strong social support network, seeking professional help from therapists, and setting proper boundaries. If you can't *care*, you can't care.

Every zookeeper has heard the classic responses to someone learning that they're a keeper: "You have the best job in the world!" "It must be amazing to work with animals everyday!" "I'd love to have a job like yours!" These responses can often make keepers feel guilty for experiencing burnout and fatigue in their jobs because it's a dream job for so many, including themselves. Engaging with these feelings and working to improve these conditions for yourself are essential skills for keepers in today's day and age. And the next time you hear someone say something like this, don't be afraid to get real with them and talk about the difficulties of the job and what must be overcome to continue working as an animal caretaker. I don't claim to be an expert in these topics, but the more open and communicative we are about the struggles within the field and sharing our stories with the public, a healthier environment can be grown for keepers and animals. Because remember, **Healthy Keepers, Healthy Animals**. Happy National Zookeeper Week 2022!

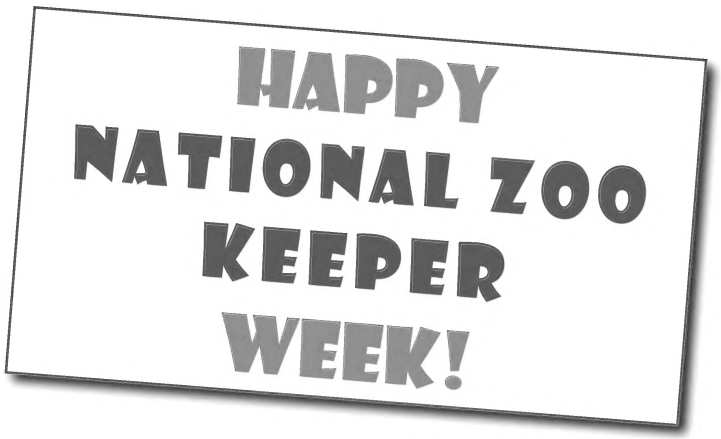
Cheers,

Paul



Be on the lookout for the Keeper N.O.T.E.S. Monthly e-Newsletter on the last Thursday of each month

Don't forget to check your e-mail settings for AAZK e-mails to go to your inbox (and not spam, promotional, etc.) to be sure you see the latest AAZK updates all in one place. You might even see familiar faces in the T-AAZK-over summaries or find an AAZK Committee to join! If your AAZK Chapter would like to be featured for a social media T-AAZK-over, e-mail us at Communication@aazk.org



CALENDAR

AUGUST 2022

August 14-19
2022 Orangutan SSP Husbandry Workshop and Course
Hosted by the Little Rock Zoo
LittleRockZoo.com

SEPTEMBER 2022

September 14-17
Venomous Herpetology Symposium
San Antonio
VenomSymposium.com

OCTOBER 2022

October 10-14
Elephant Managers Association Conference
Hosted by Milwaukee County Zoo
ElephantManagers.com/Conference

October 13-17
AAZK National Conference
Toronto, Canada
aazk2022.org

SAVE THE DATE

September 17-21, 2023
AAZK National Conference
Akron Zoo
Akron, Ohio

Submit your events to Shane Good
Shane.Good@aazk.org

Four Things Zookeepers Can Teach the World

*Loretta Breuning, PhD**

Zookeepers know how to manage temperamental gregarious mammals. Their strategies can work on your playground, your dinner table, and your meeting room. Our lives have more in common with zoos than you might imagine because all mammals have the same basic brain chemicals managed by the same core brain structures. Here are some ideas for using zookeepers' best practices in daily life.

DON'T REWARD BAD BEHAVIOR. (Or else you'll get more of it.)

When you hear a mammal shriek, you want to rush over and help. Zookeepers know that you might make it worse if you do. They monitor a situation but refrain from intervening in ways that a social animal might perceive as rewarding.

You can probably think of examples in your life. My favorite example comes from *Kicked, Bitten, and Scratched*, a book about the Exotic Animal Training and Management Program at Moorpark College. The journalist-author spent a year at the school to learn its methods. She had the idea of using them on her husband, who left dirty clothes on the floor all the time. Instead of bugging him about it like she used to, she tried the animal management approach: she praised him when he put his laundry in the basket and just ignored it otherwise. It worked!

INTRODUCTIONS TAKE TIME. (Don't expect instant acceptance.)

We often want others to accept new things quickly and we get frustrated when they don't. Zookeepers know that new things can get a bad reaction, so they plan ahead to build acceptance gradually. If you want to introduce a friend to something new, don't just open their cage and let the new thing in. They will feel attacked. Instead, put the new thing where they can smell it and see it at a distance. They may get curious and start approaching it themselves.

For example, when I wanted to switch my daughter to a new school, I took her to the school's playground a few times before mentioning it. She got to like the place. Now she's an adult starting a new job, and her employer did the same thing – the Human Resource staff planned slow, methodical introductions to her new coworkers and work rules.

ENRICHMENT ALWAYS. (The mind needs stimulation.)

The brain evolved to seek food constantly. When food is just handed to you, your natural seeking skills are not stimulated and you may feel out of sorts. Zookeepers create opportunities for a brain to use its capacities. They change the enrichment all the time because it stops being enriching when it's too familiar.

When I ask my husband if he wants to go away for the weekend, he is about as excited as an elephant who has to walk an extra 100 yards to get his food. But once we're actually on a trip, he's as excited as a baboon licking peanut butter off newspaper strips. When people don't enrich their lives, they can end up standing in front of the refrigerator without knowing why they're there. Or in front of a screen full of angry birds or celebrity mating drama. Everyone can enrich their life with goals and variety.

Zookeepers know that animals are motivated by food, but relying on food for enrichment has well-known drawbacks. So they create alternative forms of enrichment from things like old phone books, Christmas trees and children's toys. When I see animals eagerly exploring these items, I can't help suspecting that they're looking for food. But I've learned that they benefit from the new sights, sounds and smells anyway. It's a reminder that our core brain structures keep returning to survival basics, so we have to keep enriching them again.

Inner Mammal Institute

you have power over your mammalian brain chemicals

GOOD HABITS REPLACE BAD HABITS. (The brain runs on habit.)

Habits are real physical pathways in the brain. The only way to stop an old habit is to repeat a new behavior until the brain builds a new physical pathway. When an animal has a bad habit, zookeepers often help them by building a new habit that distracts from the old one. I got to participate in a goat training once, and was thrilled to see the goat's sudden learning of a new behavior. When the goat got to the top of a wobbly teeter-totter, it froze in fear, but it really wanted the treat on the other side. You could see how scared it was to take the step that made the teeter-totter flop over. But it took a small, cautious step and then another, and soon it enjoyed the reward and returned for another go. After a few tries, it zoomed across with great confidence. It's harder to train away self-protective habits, of course, but this demonstration showed the power of new learning.

I freeze like a scared goat when I look at the mess on my desk and in my closets. I want them fixed, but the path leading there seems wobbly. I conditioned myself to work on my mess in tiny steps, and I give myself a reward after each step until the job is manageable. I plan rewards that don't involve food. I have done this so often that it has become a habit. Now when I look at a mess in my life, I start tackling it in little steps, with many planned rewards along the way.

Putting it all together

I wish I had known about zookeeper methods when I was a teacher. I used to be frustrated by the many students who were "winging it" – expecting to pass my course without doing the reading.

Today I would handle it like a zookeeper. I would not reward students with passing grades if they don't do the work. I would introduce new expectations gradually instead of just announcing them. I would design assignments so they appeal to the urge to explore.

I would break challenges down to small chunks and repeat them until they are mastered. This is easier said than done. It's human to focus on misbehavior and inadvertently teach others that misbehaving is the way to get noticed. It's easy to please people in the moment instead of focusing on real needs. But if zookeepers did that, a zoo could not function. How could I make sure I use sound animal management principles despite the difficulty? I can use these principles on myself! I can reward myself only when I actually stick to my new strategy. I can give myself time to adapt to the new strategy. I can find a way to make the new way feel rewarding, and I can break it down to small steps that I can repeat until they feel natural. In short, I can respect my inner mammal instead of whipping it like a circus animal.

Managing yourself is hard. That's why we're often tempted to manage others. You may be thinking of someone you'd like to retrain right now. You may wish you could re-train millions of people, especially people in power. But it's important to remember that zookeepers accept animals as they are instead of expecting them to be different. We can accept our fellow man, even as we aspire to run things like a zookeeper.

Sometimes you can't fix a problem and the best you can do is avoid easy answers. I learned this from a zookeeper in France. I was watching the bonobos at Le Vallée des Singes (the Valley of Monkeys), and was surprised to see huge hairless patches on them. I looked for a keeper to find out more. "They pull their own hair out" he told me. I jumped to the conclusion that they had dark history of trauma and confinement, and I asked him where they were from. He said they had mostly lived in European zoos where they were well treated, but the young ones see their mothers do it and start. Then it becomes a habit. "They'll stop eventually," he said. I would have liked a fast, easy answer, but he taught me to accept that things are more complicated.

*** Loretta G. Breuning, PhD**
is Founder of the Inner Mammal Institute and Professor Emerita of Management at California State University, East Bay. She is the author of many personal development books, including Habits of a Happy Brain: Retrain Your Brain to Boost Your Serotonin, Dopamine, Oxytocin and Endorphin Levels. She was a Docent at the Oakland Zoo 2010-2016.

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First Amur Tiger Cubs Born at Roosevelt Park Zoo

Chelsea Mihalick, Senior Keeper
Roosevelt Park Zoo
Minot, ND

The ribbon has been cut for our new "Amur Tiger River Valley" habitat which features ten times the room to roam for the world's largest cat. The habitat allows for natural adaptations such as large ponds for them to swim in, cat walks to get up high and above the people, trees, and bushes to hide in anticipation to run and catch their prey. This habitat allows modern zoological practices to take place such as training to help with veterinary care.

Roosevelt Park Zoo has a SSP, Species Survival Plan, breeding recommendation for "Zoya" and "Viktor." What does this mean? I tell people it's like match.com and ancestry.com put together. Where do you even start? We just opened our new tiger exhibit which allows the proper space to breed and house cubs. How do you use this new space for introductions? Where do you do introductions? Where will we house cubs if we are successful?

This is where the planning stages begin. We reached out to our friend at Minnesota Zoo, Trista Fischer, who also happens to be the SSP vice program leader for Amur tigers. She was able to give us all the information and that truly helped make us successful. She was able to tell us what worked for the tigers at her facility and what she has tried, and what was successful. This included different options from den material to how do we make our introductions successful.

We provided Zoya, our female, with a den box months prior to even attempting to breed. We soon found out that a den box was not what Zoya wanted. She is the type of tiger that moves to the beat of her own drum; whatever Zoya does not like she makes sure to make it known. Viktor, our male, is large and in charge but also a big lazy cat. He is one that will put on a show for all to see when it comes to destroying any enrichment item given to him. So how do you put these two cats together? One that is half the size of the other and is a big scaredy cat. The other who basically destroys anything that is in his path. Our goal is obviously to have two healthy tigers at the end of the introductions but how do you start it? We had been tracking Zoya's cycle and noted when she was at the peak of it. This would be the right time to put them together.

Cub sleeping

Our team got together and decided who would be on which door, who would have fire extinguishers, who would have hoses, who would be the distraction with food and loud noises. The tigers showed interest in each other through mesh and would chuff at each other like they had known each other their entire lives. This was very promising but could change in the blink of an eye once the mesh was no longer present. When everyone was ready, doors opened, and they were together. Everyone there waited in anticipation as to what would happen next. Everyone was nervous

Zoya with cub

Zoya with Lola

but also hopeful. We all knew that cubs were our goal for this species but also to keep our adults safe. We had a few moments of gasping but more moments of "great job." Zoya soon showed Viktor that she is the boss, and she is in charge of this process. Recall training came in play at one moment of time when we decided we needed to separate them. The whistle was blown, and Viktor immediately stopped and looked to see where I was and came over right away. This was very vital to have in the introduction process and it WORKED!

We all knew that cubs were our goal for this species but also to keep our adults safe.

Introductions went well and now it became a waiting game to see if she cycles again. Days and weeks passed, and no signs of cycling had occurred. Fingers crossed that the introductions were successful and after about three months we'd have cubs. I started monitoring her weight and she kept gaining without an increase in her diet.

So again, the planning process takes place for what do we do with cubs? Where do we put them if she rejects them? What traffic do we limit to the building? What is she going to do with them?

Due date was fast approaching, and signs were pointing in the direction of her having cubs in the next day or two. Cameras are on and working and night checks are being done. WE HAVE CUBS!

We were hopeful about Zoya being a great mom but also very nervous because of her mom. When Zoya was

born at the Philadelphia Zoo, she was born to a first-time mom. She was a litter of five and Zoya was the only survivor. The family of zoos got together and found another facility that just had a litter of their own tiger cubs, Oklahoma City Zoo. This was great news for Zoya because she needed that socialization of other tigers, so she knew how to be a tiger. The one of many concerns was that this was a Sumatran tiger as opposed to Zoya which is an Amur tiger. The time came and once Lola, the Sumatran, was separated from her cubs they added Zoya into the mix. Lola took Zoya in as her own.

The phone call was made to our curator to tell her the excitement. Now we just watched her actions and hoped that she would do what was needed for this litter of cubs to be successful. When labor was all done, we had three cubs that were thriving and doing well. Zoya was doing exactly what was needed to be done to care for these new cubs.

To this day Zoya has cared for her cubs just how she should, and it gives me chills talking about her whenever someone asks how she is as a mother. This was a success story that no one really knew what the outcome would be. She grew up with three brothers and never acted like there was ever a difference between them. As Zoya kept growing she was getting bigger than everyone else and the time came where she needed a new place to live. Roosevelt Park Zoo just finished building a new tiger exhibit in hopes to breed.

With all this planning and fingers crossed, we had a successful litter of three cubs and the most amazing tiger mother we could have hoped and dreamed of.

What would we do without our amazing team of zoological facilities? We would not have this amazing story to tell, and we would not be helping this species grow. Thank you to Philadelphia Zoo for having Zoya and giving her a fighting chance, Oklahoma City Zoo for fostering Zoya and helping her grow, Trista Fischer for being the most amazing mentor we could have asked for, and finally thank you to Roosevelt Park Zoo management staff for trusting in their keepers and just going with the plan that was set in place.

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Cubs in a tub


Zoya with cubs

Treatment of Sterile Nodular Panniculitis in a Male Fossa: A team approach

Kayley Bateman, Carnivore Keeper
San Francisco Zoo

ABSTRACT

Panniculitis is inflammation of the subcutaneous fat tissue and has a wide variety of causes and presentations. One type of panniculitis is sterile nodular panniculitis or SNP. SNP is an idiopathic disorder that can be of primary origin or associated with other conditions. SNP is uncommon, with only a handful of cases reported in dogs, cats, and horses. Because SNP is so rare, knowledge about the treatment and care options of this form of panniculitis are challenging – even more so for an exotic animal housed in a protected contact setting. In October of 2020, the San Francisco Zoo veterinary team diagnosed "Dorian," a 14-year-old male fossa (*Cryptoprocta ferox*), with SNP. Here, we present the unique medical case, communication methods, keeper husbandry practices, and teamwork that supported "Dorian's" management and care throughout treatment.

INTRODUCTION

Panniculitis is a condition that has a wide variety of causes and presentations. Ultimately, it is an inflammatory response of subcutaneous fat tissue. According to O'Kell et al. (2010), the causes of panniculitis can vary and can range widely from infection, trauma, foreign body, post-injection site inflammation, vasculitis,

Photo by Marianne Hale

vitamin E deficiency, drug eruption, insect bite, neoplasia, and sterile nodular panniculitis (SNP). SNP can be the primary underlying cause or can be secondary to other conditions. Fossa (*Cryptoprocta ferox*) are endemic to Madagascar and are related to mongoose and civets. With approximately 113 individuals housed in zoos worldwide (Veron et al., 2018), the number of published studies, available information, and medical cases on fossa in human care are limited. It is with this in mind that we share aspects of a unique medical case, husbandry techniques, and the teamwork approach implemented to treat a male fossa with sterile nodular panniculitis.

"DORIAN'S" CASE

"Dorian," a 14-year-old fossa at the San Francisco Zoo was in good health in August of 2020, when we observed a lump on his right front shoulder. According to our observations, "Dorian" was behaviorally normal and mechanically not affected by the mass. Since "Dorian" seemed comfortable, our team opted for a "wait and see" approach. Several weeks later, we began to observe fur loss and discharge along the outer portion of his front right leg followed by three openings that presented in a track down the affected leg. Since the discharge and fur loss persisted for several weeks with no signs of improvement, animal care and medical staff decided that an exam and exploratory surgery of the wounds was necessary. This examination showed small draining sinuses along a clear linear track consistent with a migrating foreign body. The abnormal skin was removed and histopathology results were also consistent with a migrating foreign body.

This surgical wound healed uneventfully but on October 22, 2020, two weeks after the surgery, a new mass was noticed on the right hind leg. This mass was similar in size and presentation to the previous lump observed on the front right shoulder. Approximately two days later, we began to see an open wound erupting on the back of the right thigh. In addition to the open wound, "Dorian" began to lose fur surrounding the spot and we observed him intensely grooming the area. By the next day, we saw increased discharge, redness, and continued hair loss localized on the right rear leg. Based on the symptoms we observed, another migrating foreign body was suspected and our veterinary team prescribed a short course of antibiotics and steroids. Despite the support of oral medication, this new wound progressed, with additional open areas and greasy yellow discharge. Eventually, our animal and veterinary teams decided that another anesthetized examination was necessary to biopsy and try to close the wounds surgically.

Photo by Marianne Hale

Unfortunately, due to the location and nature of the wound, surgical intervention was not successful. In two separate procedures, our veterinary team attempted to close the area, only to have the site dehisce within hours after recovery. However, from the first exam, we determined that gravel and sand substrate had collected in a pocket of the wound. To prevent further foreign body contamination, we decided to manage "Dorian" in semi-indoor night quarters for the duration of his recovery. Shortly after these series of exams, we documented the appearance of more masses. There were approximately six in total, ranging from approximately 1" to 5" inches in diameter with variably sized areas of necrotic skin and sinuses draining a greasy yellow discharge.

Since no additional foreign bodies or other obvious causes of the lesions were discovered upon surgical intervention, a broad treatment plan was enacted pending biopsy results. Dorian's initial treatment consisted of antibiotics, NSAIDs, antifungals, and anti-parasitic medications. The biopsy results indicated severe inflammation and necrosis extending through the skin and into the subcutaneous fat but no bacteria, fungi or mycobacteria were identified in the affected tissues. The diagnosis was therefore sterile nodular panniculitis.

COMMUNICATION & TEAMWORK

As a team, we worked together navigating "Dorian's" unusual condition, and adjusted our husbandry practices to best suit his recovery. Generally, our team values staff consistency for streamlining communication and medical care. Due to how the carnivore section is structured, however, up to five different keepers may provide care to "Dorian" in any given week under normal staffing conditions. To communicate changes in "Dorian's"

condition, we created a wound-tracking chart to relay the daily changes we observed (Figure 1). This chart was a valuable tool, which significantly improved our communication, record keeping, and the overall care we were able to provide "Dorian." We also found the chart useful for keeping our staff updated on the case and current management plan. Our communication tools allowed any trained staff member to step in to provide care and have the most current information at their disposal. While we attempted to maintain consistency in staffing, we found it important to rotate other team members into the area during "Dorian's" case. This is due to the high potential for compassion fatigue and burnout that can come with providing long-term care for such an unusual case.

Another tool that proved helpful for communication was the ability to document changes in the wounds through photos. We used departmental smartphones to send photos and videos and directly communicate with our supervisors while in the field. The phones greatly improved our team's ability to document animal behavior, changes in condition, and instantly share photos and videos with both supervisors and our veterinary team. In "Dorian's" case, we were able to build a photo library that cataloged his wounds and this library served as an objective tool in communicating the changes that we were seeing.

CHANGES TO OUR HUSBANDRY ROUTINE

To assist "Dorian's" recovery, we agreed that indoor holding management was the best situation to maximize healing. We also discussed moving "Dorian" from his outdoor enclosure to a more sterile environment such

PROGRESSION OF LARGE OPEN WOUND ON BACK.
Photo credits: San Francisco Zoo Carnivore Staff

as our indoor quarantine facility. Ultimately, we concluded that familiar surroundings and the "companionship" of the (separately housed, but visible) female fossa would be the better situation for "Dorian's" welfare. Keeping "Dorian's" enclosure as clean as possible was of the utmost importance due to his wounds. As such, we made training nestbox securing a priority. Securing in a night quarters nest box was a new behavior for "Dorian," however he had previously learned to secure for brief periods in another holding area. To approximate securing and to keep the behavior positive, we began securing "Dorian" to clean every other day and kept our routine as brief as possible. We discovered that "Dorian" was very resilient, and the original behavior translated well from one location to another. In a short time, "Dorian" was voluntarily securing every day for regular cleaning and showed no signs of behavioral regression.

In addition to daily shifting and securing, as a team we maintained all of "Dorian's" trained behaviors, including his voluntary hand injection behavior throughout his bout of SNP. As we have detailed here, "Dorian's" medical condition required multiple surgeries and physical exams that involved immobilization. It was very important to our team, as well as "Dorian's" wellbeing, that the trained injection behavior remain consistent and as positive as possible. "Dorian" participated and received voluntary hand injections for all of his immobilizations, and currently continues to station and hold for mock injections in training sessions. We owe this resiliency to the dedication and commitment of our team and the level of trust we built with "Dorian" throughout the entire process.

PROGRESSION OF WOUND ON RIGHT REAR LEG.
Photo credits: San Francisco Zoo Carnivore Staff

Figure 1: Dorian Fossa Wound Tracking Record

Date	Changes to Existing areas	New lumps or wounds	Keeper Initials

Surgery site on front right leg in October 2020. Wounds and histopathology were consistent with a migrating foreign body.

Photo credit: Dr. Adrian Mutlow

December 1, 2020 surgery. Veterinary team removed large scab on "Dorian's" back (seen in November 30, 2020 photo).

Photo credit: Dr. Adrian Mutlow

MEDICATION COMPLIANCE

One of the more challenging aspects of "Dorian's" care was medication administration. Our veterinary team prescribed "Dorian" 4-5 daily medications, each of which varied in frequency, volume, and palatability. To maintain medication compliance, we relied heavily on the strong relationship we had developed with "Dorian." As a team, we worked together brainstorming new ways to present medication to increase his overall compliance. It was a balancing act, keeping "Dorian" motivated for his regular diet, participating in basic husbandry, and taking prescribed medication. Eventually, we found several food items that were rewarding and palatable enough to achieve regular compliance.

CONCLUSION

After we concluded that "Dorian's" panniculitis was a primary condition with no other underlying infectious cause, in consultation with a veterinary dermatologist, "Dorian's" main treatment was changed to immunosuppressive doses of steroids and later the addition of cyclosporine to control the inflammation. With this treatment plan, no new masses developed, and we documented very slow but steady healing over the next few months. The largest wound on his back took eight months until it was considered fully healed. Once we felt comfortable with his progress, we gave "Dorian" access to his outdoor yard. As no new masses developed following outdoor access, we progressively tapered "Dorian's" prednisolone doses while monitoring for any changes. While "Dorian" is still currently under veterinary care, we are pleased to report that "Dorian" has made a full recovery, although currently still maintained on cyclosporine at the time of writing. If it were not for the efforts of our dedicated animal care team and veterinary staff, "Dorian's" unusual case may have had a different outcome.

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PASSPORT
PASSPORT

Safety *IS* an Antecedent...

Training Tale Editors: Kim Kezer, Training Advisor for Zoo New England and Jay Pratte, Deputy Director of Life Sciences & Facilities for the Utica Zoo

The ABC's of training. The basic principles of operant learning are generally taught as: **A**ntecedent → **B**ehavior → **C**onsequence. Antecedent arrangement is critical to the success of reaching a training goal, and can be defined as "*...how the environment that the animal is in has been set up, deliberately or not. The antecedent arrangements determine which behavior the animal is most likely to perform.*" (Giljam, 2020) A good trainer will plan and structure their antecedents thoughtfully to increase the chance that their learner will exhibit the desired behavior. Proper training tools, cue clarity, preferred rewards, communication with team members, time of day... All of these are examples of antecedents regularly considered while setting training sessions up for success. In this Training Tale we share key safety components, considering them as antecedents for animal training.

Safety issues must be incorporated into all stages of training, from planning to completion. Each institution/ individual is likely to have a preferred model or approach to safety parameters and, similarly to training methodologies, there is no one "right way." One straightforward example is the "Animal Training Safety Pyramid" (Figure 1) from Zoo New England in Boston, Massachusetts, which will provide a framework to share safety considerations presented in this Training Tale.

Figure 1

Creating a safe environment for both staff and animals during training must be the top priority in both protected and direct contact animal handling scenarios. Training safety protocols should be developed and implemented to aid trainers in successfully meeting training goals and institutional safety parameters.

PLANNING

When creating a plan, the first priority is understanding the natural history of the species you will be training, followed by the individual animal's history. The first is critical in creating awareness of what the animal is capable of doing physically, allowing us to better prepare the sessions and environment to maximize safety. Understanding and recognizing the "affective state" of an animal (body language, vocalizations, displays, etc.), seasonal behavior changes, and social structures are factors to be considered. Knowledge of an individual animal's previous experiences improves a trainer's ability to predict how they

might react to given stimuli, how current behavior issues may affect a session, or that aggression concerns may exist due to rearing history or group dynamics. This information will provide the foundation for setting up the ABCs for your training goals based on awareness and risk assessment.

Planning often involves development of "shaping plans", which should encompass as many potential variables as possible, not just the steps intended to build a desired behavior. Using the Safety Pyramid model, the shaping plan process would also include those factors that would enable the trainer and participants to:

- Set up the tools, environment and communication structure to allow everyone to properly focus on the session and the learner's responses;
- Ensure that contact with the animal, whether providing reinforcement, modifying/using environmental parameters (i.e., introducing a physical positioning barrier), or direct tactile interaction is/are careful and intentional. The learner's responses are paramount in deciding on how to progress;
- No opportunities exist for the animal to contact/injure a trainer or participant, while risk of undesired contact with or damage to tools, props or the environment are considered.

Shaping plans and training programs should consider descriptions of specific instructions that focus on the "fine" details; these may include how to touch or guide an animal, what to touch the animal with, or even how to safely deliver reinforcement. Safety details should include a broad range of antecedents that may impact an animal's behavior or session success, outside of the approximations for a specific goal. Are there other animals sharing the habitat or enclosure that could affect the session, either through physical intervention or social displacement? Is the session location in an area where all participants are safe from risk of injury? Is one person recognized as overseeing the session; ready to make a snap decision on moving ahead, taking a next step, or ending earlier than planned? These are a few safety factors that become antecedents as we set up for training success. Remember, all participants (human and animal) coming out of a session intact is as much of a training goal as the intended behavior!

PURPOSEFUL KEEPER CONTACT

This section of the Safety Pyramid is intended to create mindfulness and awareness when physical contact with an animal is part of a behavioral goal. Examples may include, but are not limited to: brushing teeth, voluntary injections, blood collection, blood pressure, wound care, etc. We want to encourage trainers to think carefully about when, where and how to engage in physical contact with an animal. Touching should be limited to approved husbandry and medical behaviors. Physical contact should be carefully orchestrated and may require a second person to observe the animal's "tells" (body language) and affective state, observing carefully for signals that may indicate irritation or distress. There are usually behavioral predictors which are actually antecedents to an unexpected or undesirable response, such as breaking from position or reacting in a way that may result in injury to a person or animal.

It is also a trainer's responsibility to assess those environmental aspects of the antecedents under human control. Examples include:

- Doors and mechanisms should operate smoothly, without sticking or sudden jerks. An animal may startle and react at unexpected sharp stimuli, or mistakenly judge how fast a door is opening and risk injury to themselves, or to whomever is operating the door mechanism.
- Training area is free from risks of injury, such as an exposed fastener, broken mesh, wood splinters, etc.
- Reinforcement delivery equipment is sanitary and safe; for example, fiberglass feeding sticks for cats are blunted so that the palate is not injured if an animal lunges.
- Tools and props (such as target sticks, sleeves, blunted needles, training probes…) are well maintained and are regularly assessed to ensure they have not broken, splintered, or developed a sharp edge or burr that could result in irritation or injury.

All tools and environmental props should be introduced gradually through a combination of habituation and desensitization, to minimize reaction when presented and allow safe use as intended. Purposeful keeper contact is not solely about touching an animal for training. It encompasses all of the antecedent variables we can think of that result in physical contact, by a person AND their tools or environmental variables.

PREVENT ANIMAL CONTACT

The next section of the Safety Pyramid encourages trainers to prevent an animal from making direct contact with participants, or even other animals sharing an enclosure. This begins with a thoughtful self-evaluation of one's person, equipment, and the environment. All clothing and personal protective equipment (PPE) should be worn properly and with essential fit; items that are loose fitting, frayed or not securely attached can be grabbed by an animal, or catch on points in the environment and impair movement and reaction speed. (One of the authors once observed a mandrill yank an XL latex glove clear off of a trainer's small hand. The glove was then immediately stuffed into the animal's cheek pouch...) Lanyards or straps for whistles/clickers should have a break-away clasp or stretch to allow immediate removal. All equipment used in a training session should be designed (and utilized) to minimize the risk of an animal getting hold of or breaking items. This includes not only your training tools, but the various paraphernalia involved in your goal behaviors. Examples include swabs, tongue depressors, syringes, tooth brushes, and ESPECIALLY expensive items like ultrasound probes; if the equipment will be in the animal's

space, consider attaching it to a dowel rod or finding a way to extend your reach, minimizing risk to participants. Desensitize the animal to the presence of any equipment to decrease reactivity, consider a cue that tells the animal you are going to introduce something, and ensure any equipment can be used safely to prevent the animal from injuring participants. Some examples of risk mitigation may include using extra-long swabs/depressors, safety barriers or protective mechanisms in hazardous locations, high-probability stationary behaviors in "grounded" positions [i.e., sitting, hand targets], use of pressure versus a tourniquet for blood draws. (Fig. 2: Positioning bench for big cats that encourages stationary posture while allowing safe access to tail, hip, abdomen…)

Lion bench (Fig 2)

While we are discussing the use of items and/or equipment during a session, ensure that you have a plan on what steps you would immediately take if a session does not go as planned and equipment is compromised. Is it a primate species you can have an exceptionally high-value reward on hand at all times to trade for the lost item? Have you conditioned the lion to return for a greater volume/value reward if it is agitated and walked away with the blood pressure cuff around its tail? Is an adjacent holding area clear and available that the animal can be shifted right over and secured so that equipment can be retrieved? These are some of those "fine details" we described earlier that will improve safety overall and increase the chance of success in reaching your goals.

While we are discussing the use of items and/or equipment during a session, ensure that you have a plan on what steps you would immediately take if a session does not go as planned and equipment is compromised.

PPE considerations are integral in planning for species such as primates. This has historically been to reduce potential transmission of zoonotic diseases or parasites. Most institutions implemented strong safety parameters during the pandemic, as we started understanding how the virus impacted a wide range of species. COVID-19 is a new fact of life, and unlikely to go away. As such we should incorporate steps to minimize the risk of transmission of a span of potentially zoonotic pathogens. Determining the risks involved with proximity and contact, for both human and animal participants, should be an essential step in antecedent planning. Risk factors should include, but may not be limited to: respiratory/aerosolized fomites; fluid transmission during collections and injections; contact with exposed or soft tissue, through routine procedures like brushing teeth up to more emergent treatments of wound care. Be mindful of possible risks of injury or possible vectors of pathogen transmission, and incorporate these safety considerations into your initial planning.

Finally, consider your housing situation, particularly in regard to natural history of the species and current social dynamics. If training can only occur when multiple animals sharing a space are together, be cognizant of the social pressures that proximity and behavior of individuals higher up the social ladder are likely to exert on lower-ranking animals. Sudden bursts of aggression or displacement may occur, or refusal to participate in training if fear of interference or injury overrides the desire to earn rewards. There are many ways to safely address this type of issue, including: ensure higher ranked animals are continuously reinforced for remaining in a "stationary" position, allowing other individuals to participate (this is an excellent way to use Differential Reinforcement of an Incompatible or Other behavior [DRI or DRO]), have multiple trainers present and train all animals simultaneously, or train subordinate individuals when those of higher rank are engaged in other preferential activities (social, foraging) or with enrichment. Knowledge of the genetically predisposed social patterns for a species, coupled with an

understanding of your specific animals and their continuously evolving social structure, will aid in mitigating risks of distress, contact or injury for both human and animal participants.

FOCUS ON SESSION

The last section of the Safety Pyramid reiterates the importance of focusing on the animal and understanding its behavioral responses and affective state. Since you have now incorporated as many safety variables as possible into your antecedent arrangement, minimizing external distractions and giving the learner your full attention is vital. A primary decision-maker for a session is identified who is responsible for communicating desired goals before a session begins, and then monitors the animal's level of comfort throughout. A decision to change tactics or halt interactions may need to be made in a split second, and it is imperative that all participants are on board. There will always be time to ask questions and discuss a decision later. To maximize the safety of the animals and all participants, human and animal, there cannot be discord or disagreement during a session. Educate all participants on your goals and how to respond if something unexpected occurs. Including all potential participants in the planning stages will aid in building a foundation of trust immensely.

Lemur phone (Fig 3)

Recognize how your behavior as a trainer may affect an animal's behavioral responses. Unless it is an emergency, try not to remove your attention during a session to answer your phone, a radio, address questions, etc. If an animal has chosen to participate, all of the antecedents say "*we are now working and you can earn valued rewards*", and then you turn away to answer the radio regarding how much hay is left in the barn, you may be inadvertently creating a Negative Punishment scenario. You have unintentionally removed the opportunity to earn a reinforcer from the animal during a period where the antecedents predict a response from the trainer. This can create frustration, and could trigger aggression towards the trainer, other participants, or to other animals sharing the same space. (Fig. 3: Always pay attention to your learner during a session!)

Above all else, do not become complacent. It is a natural process for trainers to build trust with their learners. We are in this field because of our passion and caring about the well-being of animals. Never forget, no matter how well we know an animal or how long we have been with them where "nothing has ever happened", all it takes is one mistake or one bad day to change everything. We are the advocates who educate the community on what makes each species unique and "wild". Ensure you always remember as well.

In summary, safety cannot be taken for granted (obviously…). Incorporating risk assessment and mitigation into your plans as part of the antecedent structure will ensure it is understood as part of your training "culture", creating an expectation for both human and animal participants. It is impossible for this Tale to incorporate or address every possibility that could affect human and animal safety. Instead, our goal is to encourage critical thinking on the topic and provide a framework for planning. There are a ton of available resources to assist in both learning and planning. Reach out to the AAZK Behavioral Husbandry Committee, to species-specific AZA TAGs, and to other professional groups/networks such as ABMA. A little extra effort initially can save everyone from a world of hurt later on. As trainers, we ensure that physical parameters of an antecedent arrangement are always in place; incorporating safety considerations into every step of the training process sets everyone up for success.

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Protecting Sumatran Rhinos through Reforestation Efforts in Way Kambas National Park

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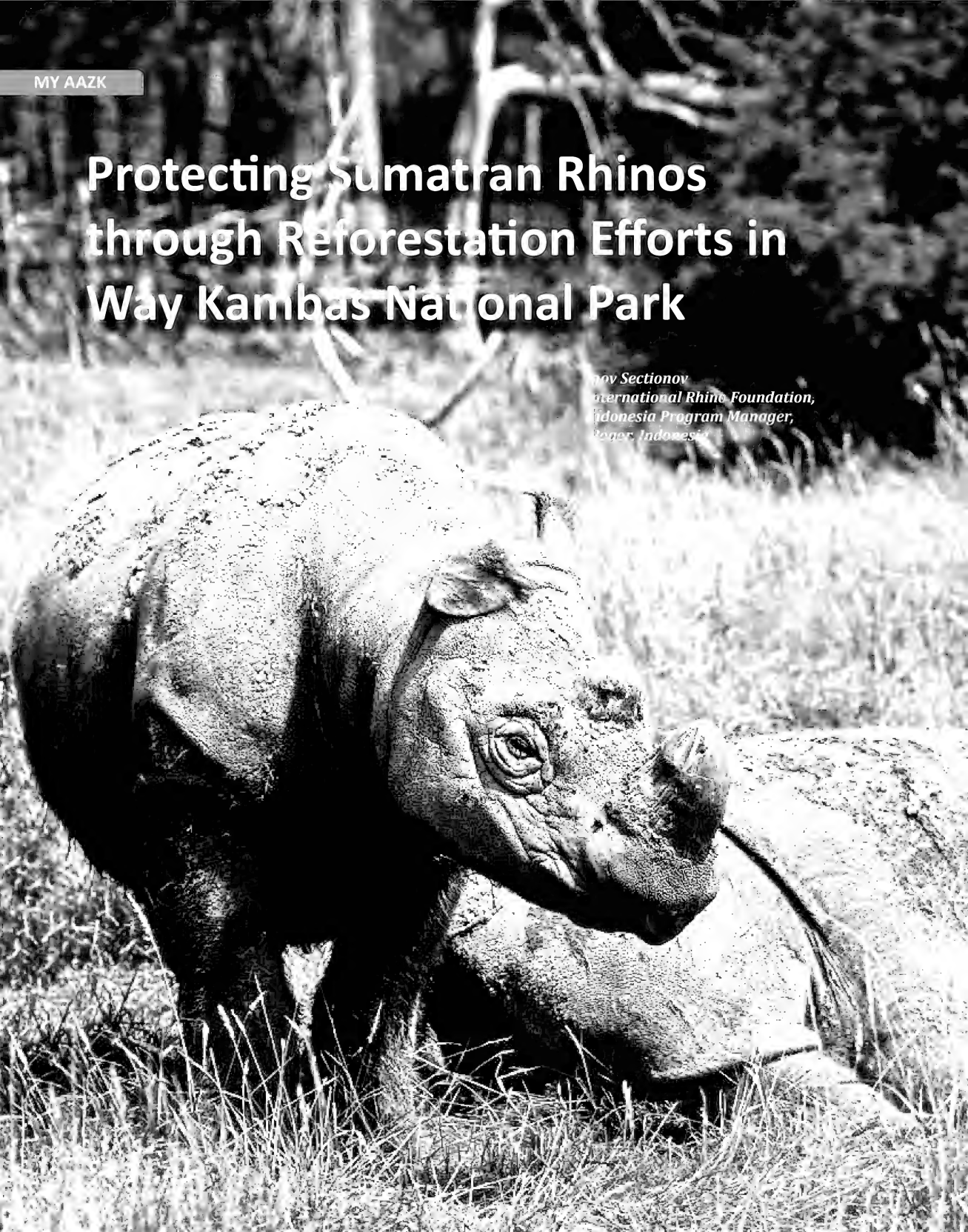

"By making the forest's neighbors stakeholders in its restoration, its founders believe the project could achieve lasting change."

PROTECTING A SPECIES, ONE SEEDLING AT A TIME

Indonesia's Way Kambas National Park shelters some of the world's most unique and threatened mammal species, including Sumatran elephants, tigers, and rhinos. Fewer than 80 Sumatran rhinos survive in the wild; the species faces an immediate risk of extinction. Experts estimate that Way Kambas is one of only two wild populations in the world large enough to reproduce and sustain itself.

Way Kambas is also the only protected area in Indonesia with no buffer zone - villages surround the park on three sides, with the fourth open to the Sunda Strait, and human settlements have frequently encroached into the park, destroying the habitat that rhinos and other wildlife need to survive. Around one-third of the rhinos' rainforest habitat has already been lost to human encroachment.

Based on the recommendations from the U.S. Fish and Wildlife Protected Area Assessment of Way Kambas in 2017, the International Rhino Foundation (IRF) and local NGOs, including Yayasan Badak Indonesia (YABI) and the Indonesian Rhino Initiative (IRI), began working with the park and local communities to replant degraded land to create more habitat for the elusive Sumatran rhino and other endangered wildlife like elephants, tigers, bears and tapirs. The goal of this reforestation project is to restore degraded habitat within Way Kambas National Park so that its population of critically endangered Sumatran rhinos can survive and grow. Sumatran rhinos are browsers, eating leaves from herbaceous plants, shrubs and trees. Studies have shown that per-acre, Sumatran rainforests contain the highest levels of plant diversity on Earth. The rich plant life consumed by Sumatran rhinos in their rainforest habitat is essential to their survival, and rhinos, in turn, are essential to maintaining the rainforest's health. Rhinos provide a valuable seed-dispersal function; as they process their plant diet, they disseminate seeds in their feces, which ensures that diverse plant life disperses throughout the forest and will persist in the long term.

The pilot program (which launched across two sites in 2018) has been successful. IRF collaborates with YABI, IRI, Way Kambas National Park and local communities and farmer groups to expand critical habitat for Sumatran rhinos. To date, we have planted 50 hectares (or 124 acres) at two sites (about three quarters the size of Disneyland).

RESTORING THE RAINFOREST

Restoration Site 1 (Rawa Bunder)

Restoration site one is located at Rawa Bunder Resort in the Way Kanan Region 1 of the National Park Management Section in Way Kambas National Park, Lampung Province. This area was used as a cassava plantation by the local community and became severely degraded between 1998 and 2010. The area frequently experiences forest fires and has a high prevalence of invasive plant species, making it unsuitable to herbivores like rhinos.

The site is surrounded by riparian forest and lowland forest, making it an important region to reforest. This site served as our pilot location and in 2019, local workers planted 15,000 seedlings. Unfortunately, in November 2019, the

Restoration site one (Rawa Bunder) from drone.

Site #1, Rawa Bunder. Image on the left shows the condition of the restoration site in the wet season. Image on the right shows the restoration team maintaining the grass before planting new seedlings. This helps minimize competition between established grasses and new seedlings.

Rawa Bunder site was damaged by a forest fire (likely intentionally set by poachers) and all the seedlings died. Poachers take advantage of the dry season to set fires. After a fire is put out, deer visit the burned areas to consume the young leaves and shoots of new-growth plants. Illegal hunters follow the concentration of deer - hunting them and other wildlife in burned areas. The prevalence of invasive plant species, particularly *Imperata cylindrica* grass, makes the area more susceptible to fire. IRF and our local partners built a fire control tower near the reforestation site to anticipate, deter and put out forest fires.

In addition to planting new seedlings in Rawa Bunder, the park maintains a Reforestation Protection Unit (or RePU) to monitor the replanting efforts and protect the area and its wildlife through regular patrols. Four rangers are now permanently assigned to oversee the reforestation activities and prevent poachers from using the area to access rhino habitat. Over the past two months, the rangers have arrested several individuals for illegal activity, and removed traps and snares set for macaques, deer and wild boar. The rangers have identified Rawa Bunder as a major entry point for poachers and encroachers into Way Kambas National Park. The presence of the RePU is beneficial in protecting both the park and restoration site, in addition to the wildlife that frequent both areas. In 2021, two poachers were arrested and 109 snares were removed, thanks to the RePU.

Reforestation Protection Unit at Site # 1 (Rawa Bunder). The RePU is responsible for monitoring the replanting efforts, detecting fires and removing snares from the reforestation site.

We are partnering with several local primary schools and scout groups at Rawa Bunder to provide educational opportunities for local students. Since the project started, more than 250 students have participated. Students learn about their local Sumatran forests and wildlife, and about the importance of protecting them. The students learn hands-on forestry skills by planting and caring for seedlings.

2021 UPDATES SITE #1 (RAWA BUNDER)

- We planted 10,000 seedlings at Rawa Bunder in 2021.
- More than 15 native species have been planted at Site #1. These include Agarwood *(Aquilaria malaccensis)*, Pulai tree *(Alstonia scholaris)*, Indonesian laurel *(Syzygium polyanthum)* and jackfruit *(Artocarpus heterophyllus)*.
- In 2021, we expanded site #1 by 10 hectares (or 25 acres). By the end of 2021, we will have restored a total of 35 hectares (or 86 acres) at Rawa Bunder.
- We began working with a forest farmer group at Rawa Bunder to enhance the restoration work. We purchase seedlings from local people, providing critical income to communities bordering the park.
- 109 snares were removed by the RePU team in 2021. This number is significantly lower than the 2020 figure (254 snares), suggesting that the presence of the RePU team is effective in deterring illegal activity.
- In anticipation of the dry season, IRF provided additional funding to local partners to purchase tools and equipment to fight fires. Further, we will add more deep wells and water towers near Rawa Bunder to aid in fire suppression.
- In January and May 2021, site #1 experienced several small fires but they were easily extinguished by the Reforestation Protection Units (RePUs).

Image on the left shows the restoration team teaching young kids near WKNP about native seedlings and how to plant the seedlings at the restoration site. Image on the right shows a scout group helping to plant seedlings at the restoration site.

Image on the left shows the plant nursery and stock of seedlings that are ready to plant at the restoration site. Image on the right shows the restoration team loading up seedlings in preparation for planting.

A forest fire surrounding restoration site one - the RePU team managed to put the fire out using tools at their basecamp.

RESTORATION SITE 2 (RAWA KIDANG)

The Way Kambas National Park (WKNP) management team, with support from IRF, YABI and IRI, collaborates with the forest farmer group, Rahayu Jaya, to conduct restoration activities in Rawa Kidang. This site is part of the park's rehabilitation zone and covers 155 hectares (383 acres). The site is divided into three blocks, block 1 covers 10 hectares and is the intensive planting area, block 2 covers 20 hectares and is the intensive restoration area, while block 3 covers 125 hectares and serves as the intensive protection area. The activities at Rawa Kidang include:

1. Planting in block 1 to increase the availability of rhino food
2. Maintaining seedlings in Block 2
3. Safeguarding Block 3 from forest fires
4. Community empowerment
5. Preparing reforested areas to harvest rhino food crops

In 2020, over 21,550 seedlings were planted at Rawa Kidang. The local community provided the seedlings to plant at the restoration site. We are pleased to report that the survival rate of seedlings at this site is more than 70% - an extremely high survival rate for reforestation efforts. The collaboration at this site between the local community, the park and conservation organizations is significantly reducing the illegal activity pressure on the national park. When the restoration work first began at Rawa Kidang, 22 families committed to participating. Now, more than 62 families have committed to the reforestation efforts. All community members, farmer groups and families who participate, sign voluntary agreements pledging not to encroach into the park for farming or hunting.


Preparing new areas at Rawa Bunder for seedlings.


Snares were removed from Rawa Bunder by the RePU team.




Additional firefighting tools and equipment provided by IRF to local communities in anticipation of the next dry season.

2021 UPDATES SITE #2 (RAWA KIDANG)

- In 2021, we reforested another 10 hectares at Rawa Kidang.
- We have planted more than 25,000 seedlings this year.
- We provided 5,000 additional seedlings to replace those that were broken or eaten by wildlife.
- 51 species of wildlife have been identified using the Rawa Kidang site.
- In 2021 we completed several new infrastructure projects to deal with ongoing forest fires. We built a new watch tower, dug new wells and created a reservoir for additional water to fight fires, irrigate seedlings and provide drinking water to wildlife.
- We provided additional financial support for local community members to purchase firefighting equipment.
- In November 2021, we donated a car to the farmer group to speed up restoration activities and help fight fires. Teams can also use the car to transport water for new seedlings during the dry season.
- More than 50 species have been planted at Rawa Kidang since the start of restoration activities. These include Salam (Syzygium polyantum), Jambon (Syzygium sp.), Bayur (Pterospermum divesifolium), Gaharu (Aquilaria mallacensis), wide fig (Ficus elastica), sempu (Dilenia excelsa), jitan root (Cuminum cyminum), Laban (Vitex quinata), Mahang (Macaranga mouritiana), Pulai (Alstonia scholaris), forest banyan (Ficus benjamina), Apak (Ficus sp), and Luwingan (Ficus sp).

Local reforestation volunteers celebrate IRF's 30th anniversary in May 2021.

Site #2, Rawa Kidang. Image on the left shows the watchtower which will be used to spot nearby fires. Image on the right shows the newly created water reservoir.

Site #2, Rawa Kidang. Top image shows the condition before planting (April 2020). Bottom image shows the growth of the seedlings after one year (June 2021).

The car (above) was donated to the head of Margahayu village at the Rawa Kidang restoration site.

Site #3, Susukan Baru. The nursery has been prepared by local people. Each member can prepare 1,000 seedlings for the restoration program

Eager farmers who began planting seedlings at site #3 already!

RESTORATION SITE 3 (SUSUKAN BARU)

Susukan Baru is the newest restoration site and we plan to begin replanting efforts there in January 2022. IRF and local partners will restore an additional 10-15 hectares at Susukan Baru, utilizing best practices from sites 1 and 2. We are excited to collaborate with an additional local NGO, the Indonesian Rhino Initiative (IRI) and three forest farmer groups in the area.

Unlike other Sumatran rhino conservation activities which continue to be delayed due to the ongoing pandemic, the reforestation efforts have continued, expanded and thrived over the past several years. We are making significant progress in Way Kambas National Park - restoring 20 hectares of primary forest in 2021 alone. The reforestation efforts are proving beneficial for all wildlife in the area, not only Sumatran rhinos. Further, by replanting native species within degraded primary forests, we can slow the disastrous impacts of climate change. Thank you to AAZK for making this work possible and helping expand the habitat for some of Sumatra's most threatened species!

We are making significant progress in Way Kambas National Park - restoring 20 hectares of primary forest in 2021 alone.

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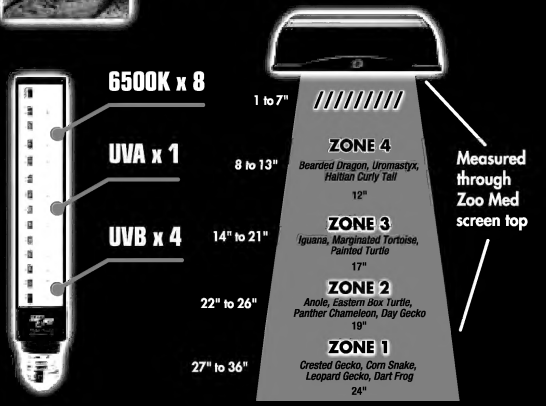

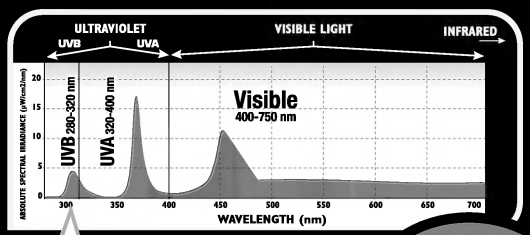

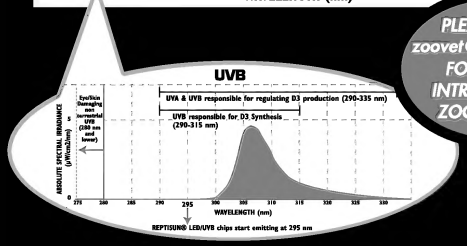

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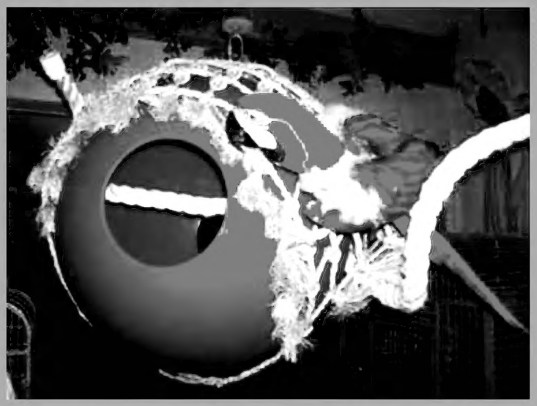

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